

## **Configurations for Robust Gold Stitch-to-Substrate Wire Bond Attachment**

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### **Abstract**

Gold wire bond attachment is a standard manufacturing process commonly used for high reliability applications due to the robust nature of the gold ball bond process on gold pads. The ball bond attachment method, typically used to make the first connection to the silicon die, is on one side of the wire where a stitch bond is used to make the wire attachment on the other side therefore electrically connecting the die to the substrate/package. Defining the process window for the stitch-to-substrate bond is more challenging as there are conditions that have a greater influence on the bond quality such as ability to apply heat, composition/quality of pad metal, and cleanliness. Adding a ball to the stitch bond can overcome the adverse effects of conditions that may not otherwise be properly controlled. Two common bump additions to the standard stitch bond are SSB and Security Bump. Previous work suggests security bumps to be more robust after 300 cycles of thermal shock. Utilizing new and more advanced equipment paired with a longer testing period, the three bond types were reevaluated. Wire pull and ball shear testing before and after thermal cycling were used to compare the bond strength and reliability of the three different stitch-to-substrate bond configurations.